FACT SHEET FOR NPDES PERMIT WA-000369-7

BOISE CASCADE CORPORATION

White Paper Division

WALLULA, WASHINGTON

FACT SHEET FOR NPDES PERMIT WA-000369-7

TABLE OF CONTENTS

FACT SHEET FOR NPDES PERMIT WA-000369-7

INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include (Chapter 173-220 WAC) procedures for issuing permits, water quality criteria (Chapters 173-201A and 200 WAC) for surface and ground waters, whole effluent toxicity (Chapter 173-205 WAC) testing and limits, and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be obtained from Ecology before a facility may discharge wastewater to state waters. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of this fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	Boise Cascade Corporation – Wallula
Facility Address	P.O. Box 500, Wallula, Washington 99363
Type of Facility:	Bleached Pulp and Paper
Discharge Location	Columbia River, River Mile 316 Outfall 001 Latitude: 46° 06' 00" N Longitude: 118° 55' 00" W.
Water Body ID Number	WRIA 32 WA-CR-1025

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

Location

The mill is located on the east shore of the Columbia River (Lake Wallula) about 15 miles southeast of Pasco, Washington on State Highway 12.

Industrial Process

The mill produces bleached kraft fine paper, bleached market pulp, and unbleached neutral sulfite semi-chemical (NSSC) corrugated media. Recently, an online coater is in the process of being considered for installation some time during the current permit cycle. The additional coater is anticipated to consume less than 0.5 gallons per minute (gpm) of additional water. Some hypochlorite will likely be used as a dye stripper in both the white water and the broke for some colored grades. Based on Boise's other plants running similar products, such as International Falls and Vancouver, increases in chloroform, AOX and chlorophenolics will be negligible. The highest continuous production rates during the 2001-2006 permit term for the above pulp and paper facilities are presented in the following table:

Production Rate Table (Machine Air-Dried Tons/Day)	
Bleached Kraft Market Pulp	427
NSSC Corrugated Medium	401
Bleached Kraft Fine and Coated Paper	772
Total Production	1,600

Receiving Water

Columbia River (Lake Wallula)
Class A water quality
River Mile 316
Outfall 001
Latitude: 46° 06' 00" N Longitude: 118° 55' 00" W.
WRIA 32 WA-CR-1025

Discharge Outfall

The mill wastewater receives primary clarification treatment followed by a secondary treatment in a two-cell aerated stabilization basin before its discharged to the Columbia River. The mill discharges its effluent through Outfall 001, which extends approximately 9,000 feet from shoreline into Lake Wallula near river mile 316. The outfall is equipped with a 512-foot-long diffuser section with 48 equally spaced 4-inch-diameter ports. The diffuser is submerged to a depth of about 55 feet.

PERMIT STATUS

The previous renewed permit for this facility was initially issued on June 20, 2001.
The effluent limits presently in effect are:

OUTFALL 001	EFFLUENT LIMITATIONS			
	Monthly	Daily	Monitoring Requirements	
Parameter	Average	Maximum	Frequency	Sample
Biochemical Oxygen composite Demand (5-day), lbs/day	15,290	29,051	7/week	24 hour
Total Suspended composite Solids, lbs/day	31,646	61,266	7/week	24 hour
Dioxin (2,3,7,8-TCDD) –	10 ppq	quarterly	24 hour	composite
AOX	–	–	weekly	24 hour composite
pH	5.1 to 9.0		Continuous	Recording
Flow, MGD	-	-	Continuous	Recording
Temperature, ^{o}F	-	-	Continuous	Recording
Production, ADT/D	-	-	Daily	

An application for permit renewal was received by the Department on December 28st, 2005 and accepted by the Department on January 23, 2006.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS MODIFIED PERMIT

The facility last received an inspection on Dec 13, 2005. The latest Class II compliance inspection with sampling was conducted on Feb 16, 2005. The Permittee was found to be complying with its permit limits.

Since the modification of the wastewater treatment plant in 2005 (to upgrade the diffused aeration zone), the Permittee has remained in compliance based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department.

WASTEWATER CHARACTERIZATION

The Permittee's effluent analysis results submitted with the renewal application indicated the presence of the pollutants listed below at concentrations above detection limits. Of the pollutants listed, arsenic, cadmium, chromium, copper, lead, nickel, and zinc are considered potentially toxic substances and are assigned water quality standards under WAC 173-201A-040. These particular substances are addressed later in this fact sheet under the toxic pollutant subcategory. No heavy metal containing discharges are expected to result from the coater installation.

Table I: **Process Effluent Wastewater Characterization presented as maximum daily values during 2002-2005.**

Parameter	Concentration
BOD_5	167 mg/L
TSS	272 mg/L
Nitrate-Nitrite(as N)	0.06 mg/L
Total Organic Nitrogen	7.3 mg/L
Oil and Grease	9.2 ppm
Total Phosphorus	0.83 ppm
Phenol, Total	ND
Radioactivity -Alpha	*7.3 pCi/L*
Radioactivity -Bets	28 pCi/L
Radium-Total	1.3 pCi/L
Sulfate	382 ppm
Sulfide	0.37 ppm
Surfactants	0.05 mg/L
Barium	158 ppm
Boron	97 mg/l
Cobalt	0.7 mg/L
Iron	357 ppm
Magnesium	7.5 ppm
Molybdenum	3.8 ppm
Manganese	425 ppm
Titanium	6 ppm
Antimony	0.33 ppb

Parameter	Concentration
Arsenic	6 ppb
Cadmium	2 ppb
Chromium	5 ppb
Copper	8.1 ppb
Lead	1.1 ppb
Nickel	8.5 ppb
Zinc	44.9 ppb

Table II:

Parameter	Average	Average High/ Low Range	Concentrat
Flow – MGD**	24.7	28.6/16.3	--
pH	--	8.8/5.7	--
BOD – lbs/day	8270.5	12655.0/4958	--
TSS - lbs/day	13030	19639/5623	--
Fecal Coliform	--	--	43 colonies/10

* milligrams per liter [mg/L]
** flow includes non-contact cooling water

STATE ENVIRONMENTAL POLICY ACT (SEPA)

There are no SEPA requirements for this permit.

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations are based upon the treatment methods available to treat specific pollutants. Technology-based limitations are set by regulation or developed on a case-by-case basis (40 CFR 125.3, and Chapter 173-220 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Whole Effluent Toxicity Testing and Limits (Chapter 173-205 WAC), Sediment Management Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992). The more stringent of these two limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were

determined and included in this permit. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and/or do not have a reasonable potential to cause a water quality violation. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The analyses of the need for limits and the derivation of limits where needed are described in the following sections for each outfall.

DESIGN CRITERIA

The design criteria for the treatment facility are listed in Table 2 below and appear sufficient to provide secondary treatment to all wastewater. The wastewater-aerated lagoon has recently been dredged in 2004, so no additional dredging is foreseen in this permit cycle. The lagoon may be dredged with Ecology's approval when the basin needs dredging.

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

Table III: **Design Standards for Peak Monthly Wasteload with Adequate Safety Factors Boise Cascade Corporation, Wallula Mill**

Parameter	Design Quantity
Monthly average flow (max. month)*	21.06 MGD
BOD_5 influent loading	87,000 lbs/day
TSS influent loading	19,156 lbs/day

* excluding non-contact cooling water

The TSS influent loading design quantity mass is greater than the effluent allowance mass. This apparent anomaly is because the influent design mass is for the kenics inlet loading and refers to a different form of TSS than the effluent discharge mass. The influent loading mass refers to nonvolatile TSS such as carryover sugars while the effluent mass is volatile TSS which is contributed by algal and bacterial mass.

OUTFALL 001 TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Technology-based limitations are set by regulations or developed on a case by case basis. EPA periodically evaluates specific industries, such as pulp and paper, and publishes federal effluent guidelines which represent technology-based effluent limitations. Washington state law imposes a requirement to provide All Known Available and Reasonable methods of Treatment (AKART), and this requirement is functionally an overlay on the federal requirements. AKART may dictate more stringent technology-based limits than the federal effluent guidelines. Federal effluent guidelines for best practicable control technology (BPT) and best conventional pollutant control technology (BCT) are equivalent as defined in Part 430 Subpart B and C for the bleached Kraft market pulp and NSSC. The applicable federal effluent guidelines for the pulp and paper industry were first proposed on December 17, 1993 as the EPA's so-called "Cluster Rule."

Following extensive review and public comments, the Cluster Rule was adopted and published by EPA on April 15, 1998. The final rule is published in 40 CFR Part 430. The applicable federal effluent guidelines are 7years old. Ecology has reviewed the treatability data base, and information concerning the high demonstrated removal efficiencies for Boise's primary and secondary treatment system. Ecology has concluded that any further treatment beyond secondary treatment would only add a few percentage points to the removal efficiencies for BOD_5 and TSS. Based on this review, Ecology determined that Boise's secondary treatment with an aerated settling basin (ASB) is equivalent to AKART for conventional pollutants in this wastewater stream, and the technology-based limits in the federal Effluent Limitations Guidelines are the appropriate limits.

The applicable portions of 40 CFR Part 430 for Boise White Paper LLC are Subpart B for the Bleached Kraft Subcategory and include: best practicable control technology available (BPT) at 40 CFR 430.22, best conventional pollutant control technology (BCT) at 40 CFR 430.23, and New Source Performance Standards (NSPS) at 40 CFR 430.25. Each of these categories provides technology-based limits in terms of pounds per day of biochemical oxygen demand (BOD_5) and total suspended solids (TSS) per thousand pounds of product produced. The technology-based limits vary for several different products produced under the Bleached Kraft Subcategory. For this subcategory, EPA defined BCT to be the same as BPT. The limits for NSPS are more stringent than for BPT.

The applicable portions of 40 CFR Part 430 for Boise White Paper LLC are Subpart C for the Unbleached Kraft Subcategory and include: best practicable control technology available (BPT) at 40 CFR 430.32, best conventional pollutant control technology (BCT) at 40 CFR 430.33, and New Source Performance Standards (NSPS) at 40 CFR 430.35. Each of these categories provides technology-based limits in terms of pounds per day of biochemical oxygen demand (BOD_5) and total suspended solids (TSS) per thousand pounds of product produced. The technology-based limits vary for several different products produced under the Unbleached Kraft Subcategory. For this subcategory, EPA defined BCT to be the same as BPT. The limits for NSPS are more stringent than for BPT.

The Permittee is authorized to accept waste streams for treatment, elementary neutralization, and final discharge from integral production facilities at the site. The current integral dischargers contribute pollutant loads that are insignificant in comparison to conventional kraft mill effluent. No allocation for pollutant loading from integral dischargers is incorporated into the proposed effluent limits. The integral production facilities at the site are the de-ink facility, the calcium carbonate plant, and the container plant. The Permittee is also authorized to collect, treat, and discharge stormwater as part of the process discharge. The Permittee is authorized to discharge tank and vessels residuals to the process sewers and waste treatment system.

An allowance has been built into the 2006-2011 permit (see Condition XXX) to accommodate future additional load sources. No specific proposal is currently being considered but the mill has been approached by potential dischargers. For example, the Port of Walla Walla is currently evaluating a Biodiesel Manufacturing Facility in Burbank, Washington. This Greenfield facility is currently evaluating "transport and treat" options for its liquid waste.

The Port expects the Burbank project to discharge approximately 1,000 gallons of liquid waste daily. Planning for this project is not complete, so an exact characterization of the waste was not ready at the time of this permit renewal, but the Port's plans call for it to be of a non-toxic, biodegradable nature.

The Port of Walla Walla contacted Boise Cascade Wallula to investigate the possibility of treating this waste in the mill's wastewater treatment plant. If the parties agree and Ecology concurs, this material would be trucked by tanker car and metered into Boise Cascade's wastewater treatment system.

DERIVATION OF TECHNOLOGY-BASED EFFLUENT LIMITS

The production rates over the past two years has increased due to growing demand for market pulp, and have averaged 1,211 tons per day (tpd) – equal to or 2,422,000 pounds per day (ppd). The mill's production output included Bleached Kraft, unbleached Kraft, and Fine Paper.

We calculate baseline production "best practical treatment" (BPT) limits for conventional pollutants based on 450 tpd (900,000 ppd) for Bleached Kraft [Subpart B of 40 CFR 430.22]:

- The BPT limits allow a maximum during any one day of 5.6 pounds BOD_5 and 12.0 pounds TSS per 1,000 pounds of product.
- The BPT limits allow an average of daily values for 30 consecutive days of 2.8 pounds BOD_5 and 6.0 pounds TSS per 1,000 pounds of product.

For facilities where bag papers and other mixed products are produced we calculate New Source Performance Standards (NSPS) limits for conventional pollutants based on 176 tpd (352,000 ppd) production of unbleached Kraft paper [Subpart C of 40 CFR 430.35]:

- The NSPS limits allow a maximum for any one day of 5.0 pounds BOD_5 and 9.1 pounds TSS per 1,000 pounds of product.
- The NSPS limits allow an average of daily values for 30 consecutive days of 2.71 pounds BOD_5 and 4.8 pounds TSS per 1,000 pounds of product.

The new NSPS effluent guidelines for unbleached Kraft paper for BOD_5 and TSS are more stringent than for existing sources. We calculate the baseline production BPT limits for conventional pollutants based on 450 tpd (900,000 ppd) for unbleached Kraft using Subpart C of 40 CFR 430.32:

- The BPT limits allow a maximum for any one day of 5.6 pounds BOD_5 and 12.0 pounds TSS per 1,000 pounds of product.
- The BPT limits allow an average of daily values for 30 consecutive days of 2.8 pounds BOD_5 and 6.0 pounds TSS per 1,000 pounds of product.

For facilities where bag papers and other mixed products are produced we calculate NSPS limits for conventional pollutants based on 176 tpd (352,000 ppd) production of unbleached Kraft paper [Subpart C of 40 CFR 430.35]:

- The NSPS limits allow a maximum for any one day of 5.0 pounds BOD_5 and 9.1 pounds TSS per 1,000 pounds of product.

- The NSPS limits allow an average of daily values for 30 consecutive days of 2.71 pounds BOD_5 and 4.8 pounds TSS per 1,000 pounds of product.

The new NSPS effluent guidelines for unbleached Kraft paper for BOD_5 and TSS are more stringent than for existing sources. The guidelines vary slightly in the applicable effluent pH limits:

- The NSPS based effluent guidelines for NSPS unbleached Kraft production set limits for pH within the range of 5.0 to 9.0.
- The existing production based unbleached Kraft set limits for pH within the range of 6.0 to 9.0.

Although the NSPS ELGs allow a greater range of pH, Boise Cascade -Wallula will be required to operate within the more stringent 6.0 to 9.0 pH range.

The aerated lagoon system is very stable with respect to treatment efficiency and accommodating shock BOD loadings.

The test procedure for BOD and TSS has a great deal of variability in its results when compared across different laboratories with different technicians performing the tests. In developing the effluent guidelines, EPA took this variability into consideration for the daily maximum allowance and the 30 days average allowance for BOD and TSS. Ecology determined that the aerated lagoon system design is equivalent to all known available and reasonable methods of treatment (AKART) for conventional pollutants.

The NPDES permit amended in July 2001 for this source defined the base line production to be 392 air dried tons per day (tpd) of Kraft bleached market pulp, 366 air dried tpd NSSC corrugated medium, 681 air dried per day tpd bleached Kraft fine paper, and 212 bleached market de-ink pulp. The market de-ink pulp facility is no longer operating, and no separate category exists for the coater, therefore we calculated the BPT and BCT limits for conventional pollutants based on production of 392 air dried tpd for bleached Kraft market pulp [Subpart B of 40 CFR 430.22]. We calculated the BPT and BCT limits for conventional pollutants based on production of 366 air dried tpd for NSSC corrugated medium [Subpart C of 40 CFR 430.32]. The limits for the production of 681 air dried tpd bleached Kraft fine paper are calculated using New Source Performance Standards (NSPS) in 40 CFR 430 Subpart B for the bleached Kraft fine paper BOD and using Best Engineering Judgment (BEJ) established by the Department for bleached Kraft fine paper TSS.

The allowance for conventional pollutants is calculated using the above appropriate categories. In the 2001-2006 permit we based discharge limits for conventional pollutants on the mill's production rates. The base production rates were established by the Permittee through demonstrated operating performance at those levels of production. Potential increased production rates were based on anticipated future improvements in utilizing existing production equipment; the increased rates were identified by the Permittee as Tier I, Tier II, and Tier III. The future permitted process improvements and corresponding production increases under Tiers I, II, and III rely on utilizing the permitted capacity of the facility.

Ecology based effluent limits for the 2006-2011 permit term on actual production demonstrated during the previous term. We found the tiered production limit approach to be unnecessary and unnecessarily complex, so we chose not to carry it forward into the 2006-2011 permit. Although the proposed tiered base rate effluent limits would be slightly higher than the 2001-2006 permit, rejecting the tiered approach results in a lower potential allowance than permitted in 2001-2006.

Maximum Production Rate Table (2001-2006 Machine Air Dried Tons/ Day)

Bleached Kraft Market Pulp	427
NSSC Corrugated Medium	401
Bleached Kraft Fine and Coated Paper	772
Total Production	1,600

CONVENTIONAL POLLUTANTS

The basis for effluent limits for conventional pollutants is production dependent and is described below. Table I presents the effluent limits derived from the effluent limitation factors.

- Best Conventional Pollutant Control Technology as denoted in 40 CFR 430 Subparts B and C for the bleached kraft market pulp and NSSC cross recovery pulp production, respectively.
- New Source Performance Standards (NSPS) as denoted in 40 CFR 430 Subpart B for the bleached kraft fine paper Biological Oxygen Demand (BOD) and Best Engineering Judgement (BEJ) established by the Washington State Department of Ecology for the bleached kraft fine paper Total Suspended Solids (TSS).

BASIS FOR EFFLUENT LIMITATIONS

Grade (Subcategory)	Basis	BOD_5 (lbs./Ton)* Monthly Average	Daily Max		TSS (lbs./Ton) Monthly Average	Daily Max
No. 1 Paper Machine (B) Bleached Kraft Market Pulp	BCT	16.1	30.9		32.8	60.8
No. 2 Paper Machine (C) NSSC Corrugated Media (Cross recovery process)	BCT	8.0	16.0		12.5	25.0
No. 3 Paper Machine (B) Bleached Kraft Fine/Coated Paper	NSPS	6.2	11.4	BEJ	17.5	35.1

* machine dried ton at the paper machine reel.

Table IV. **Production-Derived Limits At The Base Rate**

BASE			BOD			
Production Unit	ADT/Day (Off-mach)	Basis for Limit	Monthly Avg. (#/Ton)	Monthly Avg. #/Day	Daily Max (#/Ton)	Daily Max #/Day
Bleached MKT Pulp	427	BCT	16.1	6,875	30.9	13194
NSSC Medium	401	BCT	8.0	3208	16.0	6416
Fine/Coated Paper	772	NSPS	6.2	4,786	11.4	8801
Totals	**1,600**			**14,869**		**29,411**

BASE			TSS			
Production Unit	ADT/Day (Off-mach)	Basis for Limit	Monthly Avg. (#/Ton)	Monthly Avg. #/Day	Daily Max #/Ton	Daily Max #/Day
Bleached MKT Pulp	392	BCT	32.8	14,006	60.8	25,962
NSSC Medium	366	BCT	12.5	5,013	25.0	10,025
Fine and Coated Paper	681	BEJ	17.5	13,510	35.1	27,097
Totals	**1,600**			**32,529**		**63,084**

[(1)]Base rates were determined by the highest continuous production rate reported during the last permit cycle.

NON-CONVENTIONAL POLLUTANTS

EPA-established effluent limits for non-conventional pollutants, which became effective after April 15, 2001, represent the degree of effluent reduction attainable by the application of best available technology (BAT) economically achievable from Bleached Papergrade Kraft and Soda subcategory 40 CFR Part 430.24. Mass effluent limits for adsorbable organic halides (AOX) and chloroform are based on unbleached pulp entering the bleach plant. AOX is measured at the outfall. Chloroform is measured at the bleach plant. Mass limits for AOX and chloroform have been established in the permit using the tiered approach similar to the conventional pollutant. The mass limits for AOX and chloroform are based on production increase of unbleached pulp entering the bleach plant. Table V defines the production and limits for AOX and chloroform limits in the mill's effluent.

Table V. **Production-Derived Limits For Bleach Plant Discharges**

BASE	AOX				
Production Unit	ADT/Day (to bleach plant)	Monthly Avg. Factor (#/Ton)	Daily Max. Factor (#/Ton)	Monthly Avg. (#/Day)	Daily Max (#/Day)
Unbleached Pulp	1,010	1.246	1.902	1,258	1,921

BASE	CHLOROFORM				
Production Unit	ADT/Day (to bleach plant)	Monthly Avg. Factor (#/Ton)	Daily Max. Factor (#/Ton)	Monthly Avg. (#/Day)	Daily Max (#/Day)
Unbleached Pulp (Average Mos.)	1,010	0.00828	0.01384	8.36	13.98

Notes:
(1) Based on BAT discharge factors for unbleached pulp to the bleach plant
(2) Base case is determined by the highest continuous production rate reported during the last permit cycle.

BLEACH PLANT EFFLUENT LIMITS

Bleach Plant Effluent Limits for the following organic chemicals are established by 40 CFR 430.24 at minimum levels:

Pollutant	Minimum Level
2, 3, 7, 8-TCDD	10 pg/ℓ (1)
2, 3, 7, 8-TCDF	31.9 pg/ℓ (1)
Trichlorosyringol	2.5 µg/ℓ (2)
3, 4, 5-Trichlorocatechol	5.0 µg/ℓ (2)
3, 4, 6-Trichlorocatechol	5.0 µg/ℓ (2)
3, 4, 5-Trichloroguaiacol	2.5 µg/ℓ (2)
3, 4, 6-Trichloroguaiacol	2.5 µg/ℓ (2)
4, 5, 6-Trichloroguaiacol	2.5 µg/ℓ (2)
2, 4, 5-Trichlorophenol	2.5 µg/ℓ (2)
2, 4, 6-Trichlorophenol	2.5 µg/ℓ (2)

Pollutant	Minimum Level
Tetrachlorocatechol	5.0 µg/ℓ[2]
Tetrachloroguaiacol	5.0 µg/ℓ[2]
2, 3, 4, 6-Tetrachlorophenol	2.5 µg/ℓ[2]
Pentachlorophenol	5.0 µg/ℓ[2]

Notes:

(1) picograms per liter.
(2) micrograms per liter.

Minimum level is defined by EPA as "The level at which the analytical system give recognizable signals and acceptable calibration points."

BEST MANAGEMENT PRACTICES

Best Management Practices (40 CFR 430.28) are required to prevent leaks and spills of spent pulping liquors, soap, and turpentine. The permittee has established a program to accomplish this objective and is implementing the program.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

To protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 requires Ecology to condition waste discharge permits such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Surface water quality-based effluent limitations may apply to an individual waste load allocation (WLA) or to a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The U.S. EPA has promulgated 91 numeric water quality criteria for the protection of human health that are applicable to Washington State (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

ANTI-DEGRADATION

The State of Washington's Anti-degradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the State Anti-degradation Policy can be obtained by referring to WAC 173-201A-070.

Ecology will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the water body's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

MIXING ZONES

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones are authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

DESCRIPTION OF THE RECEIVING WATER

The facility discharges to the Columbia River. The Columbia River is designated a Class A receiving water in the vicinity of the outfall. Characteristic water uses include commerce and navigation, industrial water supply, and general recreation and aesthetic enjoyment. Compliance with the permit conditions should not result in degradation of water quality standards or impair any beneficial uses.

SURFACE WATER QUALITY CRITERIA (201A)

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliform	100 organisms/100 ml maximum geometric mean
Dissolved Oxygen	6.5 mg/L minimum
Temperature	20 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	10 NTU over background when the background is 50 NTU or less; or A 20 percent increase in turbidity when the background turbidity is more than 50 NTU
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and is defined as follows:

The chronic mixing zone boundary extends 358 feet (109.2 m) downstream from the diffuser, 100 feet (30.5 m) upstream form the diffuser, and its cross-width extends to 50 feet (15.2 m) beyond each end of the diffuser. The acute mixing zone boundary extends 35.8 feet (10.9 m) in any direction from the diffuser. The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of the CORMIX 2 Plume Model (Cornell Mixing Zone Expert System, Subsystem CORMIX 2, Submerged Multi-port Discharges, Cornell University, Ithaca, NY, February 1992). The dilution factors have been determined to be (from Appendix C):

	Acute	Chronic
Aquatic Life	43	306
Human Health, Carcinogen		306
Human Health, Non-carcinogen		306

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of surface water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The critical condition for the Columbia River is the seven day average low river flow with a recurrence interval of ten years (7Q10). Ambient data at critical conditions in the vicinity of the mill outfall was taken from the TMDL study which considered both historical data and an intensive monitoring study conducted in September-October 1990. The ambient background data used for this permit includes the following from Ogden Beeman & Associates, Inc, 'Dilution Ratio Study, Boise Cascade Secondary Effluent Outfall (Wallula Mill), December 20, 1991:

Parameter	Value used
7Q10 low flow	80,600 cfs
Ambient Velocity	0.15 ft/sec
Average Water Depth	45.3 feet
Depth at Discharge	58 feet
Width	3609.1 feet
Roughness (Manning)	n=0.030
Slope	< 1%
Temperature	20.6^{o} C
pH (high)	7.5
Dissolved Oxygen	8.0 mg/L

The impacts of dissolved oxygen deficiency, temperature, pH, fecal coliform, chlorine, ammonia, metals, and other toxics were determined as shown below, using the dilution factors at critical conditions described above.

BOD_5--Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitation for BOD_5 was placed in the permit.

Temperature--The effects on aquatic organisms of thermal loading has been an issue for several years. The permittee's effluent is a higher temperature than up river flow, thus we question how much it contributes toward raised temperatures in down river flow. The previous permit required the permittee to perform a receiving water (Columbia River) temperature study in the vicinity of the mill's outfall for two years during the critical ambient temperature period. It found the mill did not contribute significantly to the thermal loading to the Columbia River.

The importance of receiving water temperature continues to attract attention. Several points on the lower Columbia River were listed during 2004 on the federal Section 303(d) listing as waters where normal functions are impaired by a raised temperature. As a result, interest among biologists, fisheries, and the Department of Ecology continues to focus on sources of thermal loading to the river. Ecology modified Chapter 173-201A WAC. The rule requires discharge plume temperatures low enough so fish aren't entrained within any discharge plume for more

than two seconds, at temperatures above 33◦C. The revised rule helps permittees avoid creating areas that will cause near instantaneous lethality.

Temperature and Outfall History--The outfall and adjacent river temperature characterization were performed on at least three occasions. The Boise Cascade Wallula mill discharges "treated effluent" mixed with non-contact cooling water, via an outfall extending 8900 feet offshore, to the deepest portion of the Columbia River. The outfall extends across the shallows in the eastern portion of Lake Wallula and discharges to the deep portion of the river channel nearer to the western shore. The outfall diffuser consists of 48 equally spaced discharge ports along a 512-foot length. Each discharge port consists of a 4-inch diameter orifice drilled into a 13-1/2 inch diameter plate at the end of an 8-inch riser pipe. The ports discharge horizontally in the direction of flow. The outfall was recently inspected by a diver who confirmed all of the diffuser ports were fully functional. River current measurements (Parametrix, 2003) confirm that the local direction of flow is perpendicular to the outfall axis and parallel to the direction of effluent discharge.

In September 1989 OBA conducted a drogue study above and below the outfall. The study measured water temperatures at depths of 1, 8, and 15 meters (3, 26, and 49 feet). The temperatures at each depth were recorded simultaneously at an upstream point and at a point 300 feet downstream of the outfall. The downstream temperature at depths of 1 and 8 meters was the same as the upstream temperature at equivalent depths. At the 15-meter depth, the mean temperature over time at the downstream location was 0.1˚C greater than at the upstream location. The water temperature at the upstream location was 19.6˚C at depths of 8 and 15 meters and 19.8˚C at a depth of 1 meter. The temperatures were measured in the morning, to avoid increased stratification following an afternoon period of intense solar heating.

In 2003 Parametrix measured the water temperature along vertical transects at distances between as close as 65 feet to more than 450 feet downstream from the diffuser. The goal was to identify the incremental temperature—that is, the increase in water temperature above the ambient temperature upstream of the diffuser. The incremental temperature declined from approximately 0.35˚C at a downstream distance of 65 feet to no measurable impact at points between 100 to 150 feet downstream of the diffuser. Parametrix also measured the current velocity over depths of 4 to 55 feet. Typical velocities ranged from 0.4 meters per second (1.3 feet per second) at the surface to 0.15 meters per second (0.49 feet per second) near the riverbed. Current direction was generally perpendicular to the diffuser axis.

Parametrix (2003) also employed a numerical model to evaluate the impacts of the diffuser at the mixing zone boundary. The contractor used the Updated MERGE (UM) code for the near-field analysis and the Brook's Equation for the far-field analysis as calculated within the Visual Plumes modeling interface (Frick et al., 2004). The UM code used by Parametrix was a predecessor to the UM3 code used in current modeling. The temperature increment at the mixing zone boundary was less than 0.3˚C. Parametrix also evaluated the near-field impacts and calculated the duration of exposure to elevated temperatures based on the diffuser's jet flow velocity. The evaluation concluded: a very low likelihood of fish being entrained in a thermal plume at temperatures exceeding 33˚C for more than 2 seconds.

Current Modeling Assumptions-- The effects of thermal loading to the Columbia from mill effluent were evaluated as part of this permit renewal process. The permittee used conservative modeling assumptions. The effluent discharge flow and temperature both generally peak during the summer months. The mean wastewater treatment plant (WWTP) effluent discharge over the period August 2001 through December 2004 was 29 cubic feet per second (18 million gallons per day). Over the same period the total discharged effluent (including both WWTP and cooling water) was 39 cubic feet per second (25 million gallons per day). The model showed a mean August effluent flow of 28.6 MGD.

The mean river flow (halfway between extremes) as measured from calendar year 1960 through year 2005, was 168,000 cubic feet per second. The median flow (the middle number of a series of numbers) recorded over this same period was 147,200 cubic feet per second. The 7Q10 is the lowest average flow measured over seven consecutive days, that occurs on average once in ten years. Due to the river profile across the discharge location, the model assumes only 70 % of the 7Q10 river flow was available. The 7Q10 flow was found to be 76,400 cubic feet per second. And 70% of that measure is 53,480 cubic feet per second.

The river temperature is highest in August, so the 95th percentile temperature of 21.7C was used for hot weather/ low flow modeling. The 95th percentile effluent temperature of 35.1C was modeled.

Modeling Results. The near-field thermal impacts of the Boise Cascade thermal outfall in the Lake Wallula stretch of the Columbia River were evaluated numerically using the CORMIX and UM3 numerical codes. Although the outfall consists of 48 ports over a diffuser length of 512 feet, the ports were simulated as single-port outfalls to obtain a conservative evaluation of the downstream thermal impacts. Four scenarios were evaluated:

1. conditions that will achieve 33˚C at two-second travel distance for 7Q10 streamflow;
2. worst-case conditions (7Q10 streamflow, 95 percentile effluent discharge temperature and 95 percentile ambient temperature);
3. typical August conditions; and
4. water conservation conditions where the effluent discharge was reduced by half relative to the typical August conditions and the temperature was increased so as to maintain the heat content of the thermal discharge.

In each case, the distance at which the thermal plume centerline achieved a temperature of 33˚C was compared to the two-second travel distance.

The results of the CORMIX and UM3 numerical simulations established a zone of flow immediately downstream of the discharge port in which the centerline temperature remains at the original effluent temperature. This flow regime extends downstream 5 to 10 times the diameter of the discharge port. Within the zone of flow establishment the centerline temperature is constant and there is relatively little entrainment of ambient flows into the thermal plume. The zone-of-flow establishment was generally on the order of 2 feet in the CORMIX simulations and 1 foot in the UM3 simulations. In both cases, the two-second distance calculated using the streamflow velocity, fell within the zone of flow establishment. The calculated centerline

temperature at this distance was the same as the effluent discharge temperature. If the two-second distance is calculated using the ambient stream velocity then the effluent temperature can itself be no higher than 33˚C in order to achieve a centerline temperature of 33˚C at that distance. This is equivalent to an imposition of 33˚C as an end of pipe regulatory limit.

"Current regulation" assumes that an organism entrained into the discharge jet will travel at the speed of the jet-rather than at the much slower speed of unaltered stream flow. Our calculation of the two-second distance is based upon the solution for the centerline velocity in a jet plume. Under this solution, the two-second distance is on the order of 9 feet. All plausible effluent scenarios at this outfall will achieve a temperature of less than 33˚C at this downstream distance.

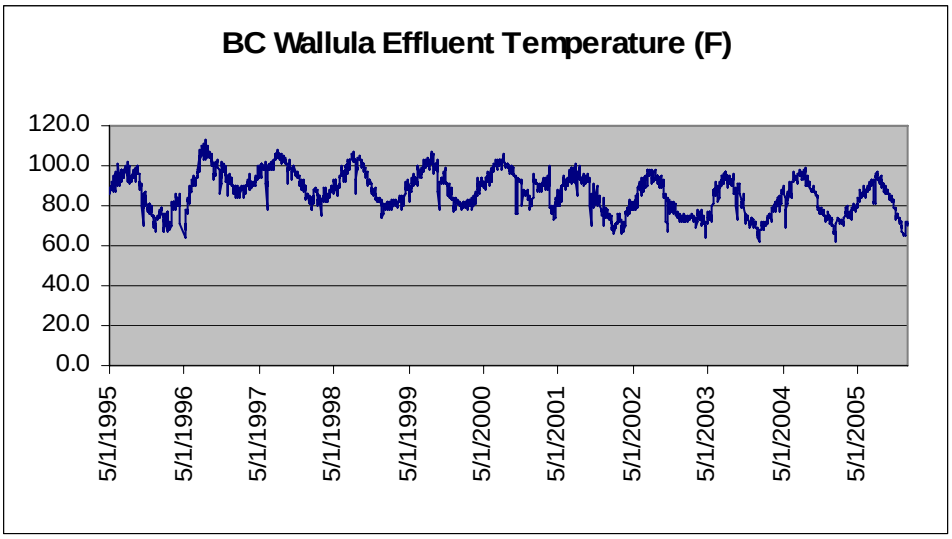
The results obtained in this most recent modeling effort are qualitatively similar to thermal diffuser calculations presented by CH2M Hill (2001). In that investigation, the UDKHDEN thermal model was utilized to determine the centerline temperature for a range of outfall designs and flow rates, in both prototypical small and large rivers. For the case most resembling that of the Boise Cascade outfall (small port diameter, discharging into a large slowly moving river; model case no. NWPPA-1a), results indicate rapid centerline temperature decline in the first 2 meters downstream of the port. The first 2 meters are traversed in one second. This is qualitatively similar to the results obtained in this investigation.

Ecology evaluated the thermal loading using the same philosophical approach used in evaluating more traditional toxics such at certain metals. Conservative assumptions are made and the expected resulting receiving water quality is compared to water quality standards. If no reasonable potential of quality standard exceedance is found, generally no further limitations are stipulated in the permit. Permit limitations are proportional to the perceived potential exceedance of water quality standards. Based on historical and current modeling results, Ecology is not proposing thermal load limitations during this permit renewal.

Ecology still considers thermal loading to the Columbia an important long-term issue. As such a Best Management Practices (BMPs) approach is incorporated into the permit. The BMP philosophy has the advantage of being flexible enough to be mill specific. In the case of Boise-Wallula this means adopting heat conservation as an ISO 14001 objective for at least the duration of this permit cycle. By maintaining a long-term focus through the formal ISO 14001 proccess on heat conservation, Ecology believes thermal loading can be minimized where no reasonable potential exists on which to base a formal heat load limitation. AKART regarding temperature management is considered self-implementing given the current energy pricing environment. High energy costs are not expected to change at least during the next permit term.

It is in the mill's economic self interest to conserve energy where possible. The effluent temperature graph below displays recent mill effluent temperature history which confirms the self-implementing nature of AKART regarding mill effluent temperature. The gradual decline in effluent temperature is attributed to mill conservation efforts driven by increasing energy costs. The Permittee was required during the 2001-2006 permit term to conduct an engineering study to evaluate the availability and cost of technology to reduce the temperature of the effluent during the critical period in the receiving water. Several opportunities were identified that were considered economically feasible under energy pricing lower than exists today. Some of these opportunities are being implemented after evaluation by the full time energy engineer employed

by the Permittee. Note that all effluent except the non-contact cooling water discharges first to the treatment lagoon. The discharges that waste heat can be removed from for additional mill use are generally too small to have a noticeable thermal load impact on the final effluent temperature because they make up such a small volume of the lagoon volume.



pH-- Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitations for pH were placed in the permit. The permittee will monitor on the final effluent pH. Any excursions below 4.1 or above 10.0 will be considered as violations. Continuous monitoring, recording, and reporting of the pH are placed in the permit. This condition was in the previous permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

A reasonable potential analysis (See Appendix C) was conducted on the parameters reported in the Permittee's application which were above detection limits and for which water quality or human health standards exist. See Appendix C for this analysis. The parameters were evaluated at critical conditions with procedures given by EPA. The parameters used in the critical condition modeling are as follows: acute dilution factor **43:1**, chronic dilution factor **306:1**, receiving water temperature 20.6^{o}C, receiving water alkalinity 150 (as mg $CaCO_3$/L).

No valid ambient background data was available for inorganic antimony, chromium, copper, mercury, nickel, and silver. A determination of reasonable potential using zero for background resulted in no reasonable potential.

Water quality criteria for metals in Chapter 173-201A WAC are based on the dissolved fraction of the metal. The Permittee may provide data clearly demonstrating the seasonal partitioning of

the dissolved metal in the ambient water in relation to an effluent discharge. Metals criteria may be adjusted on a site-specific basis when data is available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge.

Metals criteria may also be adjusted using the water effects ratio approach established by USEPA, as generally guided by the procedures in USEPA Water Quality Standards Handbook, December 1983, as supplemented or replaced.

Arsenic Discussion--A sample of outfall effluent submitted to an outside laboratory by the Permittee indicated arsenic (as total arsenic) present at 6 ppb. Evaluating arsenic analysis is complicated because it is the inorganic form only that is of concern. Refer to the paragraphs below for further discussion about arsenic. For the reasons set forth below, Ecology is not proposing monitoring for arsenic during this permit term. Evaluation of compliance with human health criteria will be an ongoing activity and the Department's current position may change in the future depending on effluent characteristics.

In 1992 the USEPA adopted risk-based arsenic criteria for the protection of human health for the State of Washington. The criterion for marine waters is 0.14 μg/L inorganic arsenic, and is based on exposure from fish and shellfish tissue ingestion. The freshwater criterion is 0.018 μg/L, and is based on exposure from fish and shellfish tissue and water ingestion. These criteria have caused confusion in implementation because they differ from the drinking water maximum contaminant level (MCL) of 50 μg/L, which is not risk-based, and because the human health criteria are sometimes exceeded by natural background concentrations of arsenic in surface water and ground water.

In Washington, when a natural background concentration exceeds the criterion, the natural background concentration becomes the criterion, and no dilution zone is allowed. This could result in a situation where natural groundwater or surface water used as a municipal or industrial source-water would need additional treatment to meet numeric effluent limits even though no arsenic was added as waste. Although this is not the case for all dischargers, we do not have data at this time to quantify the extent of the problem.

A regulatory mechanism to deal with the issues associated with natural background concentrations of arsenic in groundwater-derived drinking waters is currently lacking. Consequently, the Water Quality Program, at this time, has decided to use a three-pronged strategy to address the issues associated with the arsenic criteria. The three strategy elements are:

1. Pursue, at the national level, a solution to the regulatory issue of groundwater sources with high arsenic concentrations causing municipal treatment plant effluent to exceed criteria. The upcoming revision of the MCL for arsenic offers a national opportunity to discuss how drinking water sources can affect NPDES wastewater dischargers. This discussion should focus on developing a national policy for arsenic regulation that acknowledges the risks and costs associated with management of the public exposure to natural background concentrations of arsenic through water sources.

2. Additional and more focused data collection. The Water Quality Program will in some cases require additional and more focused arsenic data collection, will encourage or require dischargers to test for source water arsenic concentrations, and will pursue development of a

proposal to have Ecology's Environmental Assessment Program conduct drinking water source monitoring as well as some additional ambient monitoring data. At this time, Washington NPDES permits will contain numeric effluent limits for arsenic based only on treatment technology and aquatic life protection as appropriate.

3. Data sharing. Ecology will share data with USEPA as they work to develop new risk-based criteria for arsenic and as they develop a strategy to regulate arsenic.

WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC_{50}, EC_{50}, IC_{25}, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center 360-407-7472 for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

An effluent assessment for acute and chronic toxicity is required in this 2006-2011 permit term. Both acute and chronic testing is required once in the summer and once in the winter within two years of the July 1, 2011 permit expiration. Results will be submitted with the next permit renewal application.

Tables 1 through 4 below summarize the most recent results of WET testing conducted on mill effluent. The summer bioassay was run in 2005 between June 23 and June 30. The winter bioassay was run in 2006 between January 31 and February 7.

Table 1
Summary of Acute Results (Percent Survival)
Ceriodaphnia dubia

Concentration (%)	Summer 0 hr	Winter 0 hr	Summer 24 Hr	Winter 24 Hr	Summer 48 hr	Winter 48 hr
Control	100	100	100	100	100	90
0.33	100	100	100	100	100	100
2.3	100	100	100	100	100	100
10	100	100	100	100	100	100
30	100	100	100	100	100	95
100	100	100	100	95	100	90

Summer NOEC – 100% Effluent LC_{50} – greater than 100% Effluent
Winter NOEC – 100% Effluent LC_{50} – greater than 100% Effluent

Table 2
Summary of Acute Results (Percent Survival)
Fathead Minnow

Concentration (%)	Summer 0 hr	Winter 0 hr	Summer 24 hr	Winter 24 hr	Summer 48 Hr	Winter 48 Hr	Summer 72 hr	Winter 72 hr	Summer 96 Hr	Winter 96 Hr
Control	100	100	100	100	97.5	92.5	97.5	92.5	92.5	90.0
0.33	100	100	100	100	95.0	100	95.0	100	87.5	92.5
2.3	100	100	100	97.5	95.0	97.5	95.0	97.5	92.5	95.0
10	100	100	100	100	97.5	100	95.0	100	92.5	97.5
30	100	100	100	100	100	100	100	100	97.5	97.5
100	100	100	100	100	92.5	97.5	92.5	95.0	85.0	92.5

Summer NOEC – 100% Effluent LC_{50} – greater than 100% Effluent
Winter NOEC – 100% Effluent LC_{50} – greater than 100% Effluent

Table 3
Summary of Chronic Results
Ceriodaphnia dubia

Concentration (%)	Summer Percent Survival	Winter Percent Survival	Summer No. Young Per Adult	Winter No. Young Per Adult
Control	100	100	29.5	31.6
0.15	100	90	31.5	27.3
0.33	100	100	29.8	32.3
1.0	100	100	30.2	31.9
2.3	90	90	27.7	26.2
5.0	100	100	27.9	30.0

Summer NOEC – 5% Effluent LOEC – greater than 5% Effluent IC_{25} - greater than 5% Effluent
Winter NOEC – 5% Effluent LOEC – greater than 5% Effluent IC_{25} - greater than 5% Effluent

Table 4
Summary of Chronic Results
Fathead Minnow

Concentration (%)	Summer Percent Survival	Winter Percent Survival	Summer Mean Dried Weight (mg) Per Fish	Winter Mean Dried Weight (mg) Per Fish
Control	100	100	0.930	0.941
0.15	92.5	100	0.850	0.970
0.33	100	97.5	0.884	0.934
1.0	100	97.5	0.861	0.878
2.3	92.5	97.5	0.853	0.927
5.0	97.5	100	0.922	0.971

Summer NOEC – 5% Effluent LOEC – greater than 5% Effluent IC_{25} - greater than 5% Effluent
Winter NOEC – 5% Effluent LOEC – greater than 5% Effluent IC_{25} - greater than 5% Effluent

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992). The Department has determined that the applicant's discharge does not contain chemicals of concern based on existing data or knowledge. The discharge will be re-evaluated for impacts to human health at the next permit reissuance.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400). The area around the Boise Cascade Wallula Facilities intake and effluent is not identified as impaired in the current 303 d list for Sediment. The Department has determined through a review of this monitoring that this discharge has no reasonable potential to violate the Sediment Management Standards.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect beneficial uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

Wallula Mill Ground Water Study, January 1997 prepared by Barr Engineering Company and EGR & Associates, Inc. in response to Administrative Order DE 95-QWI049 to evaluate the impact of the mill's wastewater treatment lagoon on groundwater quality. The results of this study indicated that a monitoring well was installed next to the Boise Cascade wastewater treatment lagoon and screened at the water table to intercept constituents from the lagoon. Adsorbable organic halides (AOX) were not detected in samples from this well. The results the analyses of samples from this well are comparable to the results from the analyses of samples

from the Columbia River. The results from the analyses of samples from this well show no discernable effects of leakage from the mill's wastewater treatment lagoon. The concentrations of constituents in samples from the monitoring well were most like those in the Columbia River, rather than the mill's lagoon. Since the AOX were not detected from the analysis, effluent sourced BOD and TSS discharged to the well appears insignificant. Therefore, there will be no limitations or monitoring requirements placed in the permit during this permit phase.

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved. The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

MONITORING SCHEDULE AT EFFECTIVE DATE

All parameters listed in this section shall be monitored as of the effective date of this permit through July 1, 2011. The frequency of monitoring is subjectively determined in accordance with factors described in section XIII of Ecology's Permit Writer's Manual. The Permit Writer's Manual offers a Method 1 and Method 2 approach for developing monitoring frequency. Two conflicting objectives are balanced in establishing monitoring frequency. Historical good performance, which is characterized by monitoring results consistently below permitted limits, justifies reduced monitoring. Balanced against reduced monitoring is the opposite objective of frequently monitoring an industrial effluent which could impact receiving water quality under worse case scenario. For the conventional pollutants BOD and TSS, Ecology proposes a minimum monitoring frequency of 3/week even though the Permittee's past performance indicates less frequent monitoring may be statistically justified. This is consistent with the Method 1 approach outlined in Section XIII 1.3.1 of Ecology's Permit Writer's Manual. Monitoring frequency may be reduced further in subsequent permit cycles based on historical performance.

Ecology is not proposing continued monitoring for COD. On record is 5 years of COD monitoring results. There are no formal COD effluent limitations or monitoring requirements. COD monitoring was required during the 2001-2006 permit term for informational purposes. An additional argument against COD monitoring is the generation of a waste material as a result of sample analysis which designates as dangerous waste.

The monitoring frequency for chlorinated organics is based on federal effluent monitoring guidelines set forth in 40CFR Par430.02. The 2001-2006 permit implemented the monitoring frequency stipulated by federal regulation. These same federal regulations allow adjustment in monitoring frequency after 5 years of monitoring have occurred. Ecology is adjusting the monitoring frequency for many of the chlorinated organic parameters, as allowed by federal regulation.

Proposed Monitoring Frequency During the 2006-2011 Permit Term

Category	Parameter	Units	Sample Point (Point of Compliance)	Minimum Sampling Frequency	Sample Type
	Kraft Pulp Production	ADT/Day	To the bleach plant	Daily	
	Paper Production	MDT/Day	At the reel[b]	Daily	
Waste-water Effluent	Flow	MGD	Final Effluent	Daily	Continuous recording
"	BOD_5	mg/l	Secondary Treatment Effluent	3/Week	24 hour composite
"	TSS	mg/l	Secondary Treatment Effluent	3/Week	24 hour composite
"	pH	Standard Units	Final Effluent	Daily	Continuous recording
"	Temperature	^0F	Final Effluent	Daily	Continuous recording
"	AOX	µg/l	Final effluent	Once a month	24 hour composite
"	2,3,7,8-TCDD	pg/L	Final effluent	Annually	24 hour composite
"	2,3,7,8-TCDD	pg/L	Bleach Plant Effluent	Quarterly	24 hour composite
"	2,3,7,8-TCDF	pg/l	Final Effluent	Annually	24 hour composite
"	2,3,7,8-TCDF	pg/l	Bleach Plant Effluent	Quarterly	24 hour composite
"	Chloroform	µg/l	Bleach Plant Effluent	Once during permit term	24 hour composite

Category	Parameter	Units	Sample Point (Point of Compliance)	Minimum Sampling Frequency	Sample Type
	Trichlorosyringol 3,4,5-trichlorolcatechol 3,4,6-trichlorolcatechol 3,4,5-trichlorolguaiacol 3,4,6-trichlorolguaiacol 4,5,6-trichlorolguaiacol 2,4,5-trichlorolphenol 3,4,6-trichlorolphenol Tetrachlorocatechol Tetrachloroguaiacol 2,3,4,6-tetrachlorophenol Pentachlorophenol	µg/l	Bleach Plant Effluent	Once during permit term	24 hour composite
Sludge	2,3,7,8-TCDD	Ng/Kg	Primary Sludge	Once per permit cycle	Grab
	2,3,7,8-TCDF				

LABORATORY ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* The laboratory at this facility is accredited for: BOD, TSS, DO, and pH. The mill hires Washington State accredited laboratories to perform all other permit testing and data requirements.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S.3 are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

SPILL PLAN

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

The Permittee has developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the Permittee to update this plan and submit it to the Department.

SOLID WASTE PLAN

The Department has determined that the Permittee has a potential to cause pollution of the waters of the state from leachate of solid waste. This proposed permit requires, under authority of RCW 90.48.080, that the Permittee develop a solid waste plan to prevent solid waste from causing pollution of waters of the state. The proposed permit requires the Permittee to update this plan and submit it to the Department.

OUTFALL EVALUATION

Proposed permit requires the Permittee to inspect the underwater portion of the outfall in the fourth year of the permit to document the integrity and continued function of the line. These inspections shall consist of photographic verification. A written summary of the inspection report shall be submitted to the Department with the permit application at least 180 calendar days prior to the permit expiration date.

TREATMENT SYSTEM ADEQUACY AND ONGOING OPERATING PLAN

In accordance with state and federal regulations, the Permittee is required to take all reasonable steps to properly operate and maintain the treatment system (40 CFR 122.41(e)) and WAC 173-220-150 (1)(g). An operation and maintenance manual was submitted as required by state regulation in the previous permit. Ecology believes the implementation of the procedures in the Treatment System Operating Plan reasonably ensures compliance with the terms and limitations in the permit.

The Permittee also submitted an assessment of the treatment system's adequacy to achieve compliance with implementation of the Cluster Rule. In 2001, regulated foul condensate was hard piped directly to the inlet area of Cell I of the ASB to achieve compliance with the pulping condensate NESHAP requirements of the Cluster Rule. New baffle curtains were installed in

Cell II to improve wastewater distribution, increase wastewater residence time, and reduce the deposition of solids there by improving treatment system efficiency.

Additional upgrades to the treatment system were completed in 2005. These improvements involved replacement of the existing aeration system with a course bubble air diffuser system. In addition to being more efficient, the new system will cover more of the lagoon and result in better mixing and treatment. This overall effort was done to assure treatment system adequacy for implementation of the Clean Condensate Alternative as part of the Cluster Rule. The effects of the 2005 changes were assessed by CH2MHill. The adequacy of the treatment system upgrades was demonstrated by the improved treatment system performance even with the additional treatment system demands.

Special condition S.4 in the permit will require the Permittee to update its Treatment System Operating Plan within 6 months of the effective date of the 2006-2011 permit renewal.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual industrial NPDES permits issued by the Department.

Condition G1 requires responsible officials or their designated representatives to sign submittals to the Department. Condition G2 requires the Permittee to allow the Department to access the treatment system, production facility, and records related to the permit. Condition G3 specifies conditions for modifying, suspending or terminating the permit. Condition G4 requires the Permittee to apply to the Department prior to increasing or varying the discharge from the levels stated in the permit application. Condition G5 requires the Permittee to construct, modify, and operate the permitted facility in accordance with approved engineering documents. Condition G6 prohibits the Permittee from using the permit as a basis for violating any laws, statutes or regulations. Conditions G7 and G8 relate to permit renewal and transfer. Condition G9 requires the Permittee to control its production in order to maintain compliance with its permit. Condition G10 prohibits the reintroduction of removed substances back into the effluent. Condition G11 states that the Department will modify or revoke and reissue the permit to conform to more stringent toxic effluent standards or prohibitions. Condition G12 incorporates by reference all other requirements of 40 CFR 122.41 and 122.42. Condition G13 notifies the Permittee that additional monitoring requirements may be established by the Department. Condition G14 requires the payment of permit fees. Condition G15 describes the penalties for violating permit conditions.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards for Surface Waters, Sediment Quality Standards, or Water Quality Standards for Ground Waters, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

PROPOSED PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this proposed permit be issued for five years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department of Ecology proposes to reissue a permit to Boise Cascade's paper mill located in Wallula, Washington. The permit prescribes operating conditions, pollution control standards, and waste discharge limits. This fact sheet descries the federal pollution control standards and the state water quality criteria apply to the mill during the next five-year permit term.

Ecology will place a Public Notice in *the Tri-City Herald* on July 15, 2006 to inform the public about the proposed National Pollution Discharge Elimination System (NPDES) permit renewal. The Notice will tell where copies of the draft permit and fact sheet are available for review. It will invite people to comment on how well the draft permit would protect the Columbia River from the mill's discharge. The draft permit and fact sheet are available for inspection between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment. Visit Ecology's headquarters building in Lacey (360/407-6916), or our Richland Field Office (509/372-7920):

WA Department of Ecology
Industrial Section – HQ Bldg. (3B)
300 Desmond Drive SW
Lacey, WA 98503

WA Department of Ecology
Richland Field Office
3100 Port of Benton Blvd.
Richland, WA 99354

Send written comments to Robert Carruthers:

WA Department of Ecology
Industrial Section, PO Box 47706
Olympia, WA 98504-7600

Ask about the proposed NPDES Permit:

Robert Carruthers, P.E.
phone: 360/407-6954
e-mail: rcar461@ecy.wa.gov

You may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period (July 15 – August 15, 2006). Any request for a hearing must define your interest in the permit and explain why the hearing is warranted. The Department will hold a hearing if it finds significant public interest in the draft permit (WAC 173-220-090). Ecology will publish a Notice of the date, time, and place of any hearing at least thirty (30) days in advance. Each person expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Your comment should refer to certain text, followed by your concern, and a proposed modification when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of protection afforded by permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider the merits of all comments received during the public comment period before deciding to issue, revise, or deny the permit. After writing the final permit, the Department will compile responses to all significant comments and send copies directly to people who expressed an interest in this permit.

Further information may be obtained from the Department by writing to the address listed above.

This draft permit renewal and fact sheet were written by Robert Carruthers.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The average of the measured values obtained over a calendar month's time.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect potable water, industrial water, and wastewater for pathogens harmful to human health.

Chronic Toxicity--The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's life span or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minimum Level (ML)—The level at which the analytical system given recognizable signal and acceptable calibration point.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Responsible Corporate Officer-- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at http://www.wa.gov.ecology.

APPENDIX D--RESPONSE TO COMMENTS